10. Ricardo

Program Name: Ricardo.java **Input File: ricardo.dat**

Ricardo has been following his New Years resolution of regularly going to the gym. At this point in time, he has gotten comfortable with many different exercises. In fact, he is comfortable with so many exercises, he has decision paralysis and cannot decide which exercises to do when he goes to the gym.

To help with this, Ricardo has developed "workout plans". Each workout plan is one of the following:

1. A single exercise (e.g. "`squats`"). All exercise names are made of lowercase English letters.
2. An option between multiple workout plans. These are surrounded by parentheses and separated by '`|`' characters. (e.g. "`(rows|curls)`"). This means that Ricardo can choose to either do rows or curls.
3. A sequence of workout plans in order. These are surrounded by parentheses and separated by '`,`' characters. (e.g. "`(running,deadlift,stretch)`"). This means that Ricardo runs, then does deadlifts, then stretches.

Since workout plans can nest, these plans can get quite complicated, and there can be many options. Now, Ricardo is wondering, how many different workouts can he complete given a plan? Two plans are different if Ricardo makes a different decision when presented with an option. Note that different exercises can have the same label. For example, there are two different workouts for the plan "`(a|a)`".

Input:
The first line of input is T (1 <= T <= 30), the number of test cases. Each test case is a single workout plan. Each workout plan consists only of lowercase letters, parentheses, and the '`|`' and '`,`' characters. No workout plan has more than 200 characters.

Output:
For each test case, output the number of workout plans that Ricardo can do. Format your answer with the case number as in the samples. It can be proven that given the bounds on the input data, the total number of workouts will fit into a signed 64-bit integer data type.

Sample input:
```
4
(rows|curls)
(running,deadlift,stretch)
(lunge,(rows|curls),(squats|press))
(a|a)
```

Sample output:
```
Case #1: 2
Case #2: 1
Case #3: 4
Case #4: 2
```

Sample Explanation:
In the third test case, these are the possible workouts:

1. lunge, rows, squats
2. lunge, rows, press
3. lunge, curls, squats
4. lunge, curls, press